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INSTRUMENT CONTROL
SYLVANIA SES -- West

5N 223

MODEL 159PS
POWER SUPPLY

Operating
INSTRUCTIONS

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MA24298

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MEASUREMENTS
A McGRAW-EDISON DIVISION
BOONTON NEW JERSEY

CONTENTS

	Paragraph	Page
CHAPTER 1. INTRODUCTION		
Scope of Manual	1	1
General	2	1
Technical Characteristics	3	2
Power Source	4	2
Components Supplied	5	2
CHAPTER 2. CONTROLS		
Power	6	3
Sensitivity Control	7	3
DIODE - OSC Switch	8	3
C.W. - DIODE Switch	9	3
INT - EXT Switch	10	4
Grid-current Meter	11	4
Phones	12	4
Fuse	13	4
Pilot Light	14	4
Chapter 3. OPERATION		
Installation	15	5
Preliminary Operational Checks	16	5
Operation as a Grid-dip Oscillator	17	5
Operation as a Variable Frequency Oscillator	18	6
Operation with Phones	19	6
Chapter 4. MAINTENANCE INSTRUCTIONS		
General	20	6
Circuit Failure	21	6
Tube Replacement	22	6
APPENDIX I Storage & Shipment		7
APPENDIX II Table of Parts		8
SCHEMATIC WIRING DIAGRAM		10

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FOREWORD

Additional information with regard to the applications and maintenance of this equipment will be available from time to time. Users of the Model 159 Series of Instruments are urged to discuss their problems with us and to suggest such modifications as might make the instruments more adaptable to their special requirements.

Whenever possible, maintenance difficulties should be reported to Measurements before proceeding with the actual repairs. Through our familiarity with the instruments, we are in a position to suggest the most expedient and accurate repair procedure.

These instruments have been designed and manufactured to the highest standards of instrument quality. With reasonable care, many years of trouble-free service can be expected of them.

Megacycle Meters are available in the following ranges:

Model 159 LF 0.1 to 4.5 Megacycles.
Model 159 RF 2.2 to 420 Megacycles
Model 159 UHF 420 to 940 Megacycles.

The Model 159 Power Supply is a common source of power for these three Megacycle Meters.

Engineering Department
MEASUREMENTS

A McGraw-Edison Division

Boonton, New Jersey

FIGURE 1. MODEL 159 POWER SUPPLY

CHAPTER 1

INTRODUCTION

1. SCOPE OF MANUAL

a. This manual describes the basic operation, construction and maintenance of the Model 159 Power Supply. Following the text of the manual are two appendices. Appendix I describes the recommended procedure for preparing the instrument for prolonged storage or reshipment. Appendix II contains an Identification Table of Parts, listing reference symbols, name, description and drawing number of each part required for maintenance.

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2. GENERAL

a. The Model 159 Power Supply is a compact source of power and control for the following Megacycle Meters:

Model 159 LF Megacycle Meter.
Model 159 RF Megacycle Meter.
Model 159 UHF Megacycle Meter.

b. The case is designed to provide safe storage for the coil sets of the Model 159 RF and LF Megacycle Meters. A convenient carrying handle is provided making the unit completely portable.

3. TECHNICAL CHARACTERISTICS

a. The Model 159 Power Supply provides solid state regulated direct current voltages for the various Megacycle Meters.

b. Heater voltage is supplied for the oscillator tubes of the Megacycle Meters.

c. Connection for these voltages is thru connector P2.

4. POWER SOURCE

a. 115 volts 50 - 60 cycles AC.

b. Power input is 30 watts.

5. COMPONENTS SUPPLIED

Quan.	Description	Dimensions			Weight
		Height	Width	Depth	
1	Model 159 Power Supply		4-3/4"	7-1/2"	6-1/2#
1	Manual of Operating Instructions				
1	Tube OA2 Installed				
1	Power Cord				

CHAPTER 2

CONTROLS

6. POWER

a. Power is supplied to the Model 159 Power Supply by plugging the power cord into the 3 prong male receptacle located at the lower rear of the instrument and to the power source.

b. Voltages are supplied to the Megacycle Meter selected, by plugging its cord into the female 6 contact receptacle located to the left of the power receptacle.

c. The Power Switch S1 is combined with the Sensitivity Control. By rotating this Control clockwise the line voltage is applied to the primary of the transformer T1.

d. The Pilot Light is located within the instrument and illuminates the meter face when the line voltage is applied.

7. SENSITIVITY CONTROL R12

The Sensitivity Control R12 near the center of the front panel provides a means of adjusting the grid current for on-scale readings.

8. DIODE - OSC Switch S4

a. The DIODE - OSC Switch S4 is located to the left of the Sensitivy Control.

b. In the DIODE position, the plate voltage is removed from the oscillator tube in the Megacycle Meter, changing this tube from an oscillator to a DIODE detector. In this position the instrument may be used as an absorption wavemeter.

c. In the OSC position, plate voltage is applied to the oscillator tube, either modulated or unmodulated depending upon the position of the C.W. - MOD Switch S3.

9. C.W. - MOD Switch S3

a. The C.W. - MOD Switch S3 is located to the right of the Sensitivity Control.

b. In the C.W. position the instrument may be used as a Grid-Dip Meter.

c. In the MOD position the oscillator tube may be modulated either internally or externally depending upon the position of the INT - EXT Switch S2.

10. INT - EXT Switch S2

a. The INT - EXT Switch S2 is located to the right of the C.W. - MOD switch S3, and is effective when S3 is in the MOD position.

b. In the INT position, the oscillator tube is modulated by 120 cycles from the Power Supply.

c. In the EXT position, the oscillator tube is modulated by connecting an external source at the MOD jack J1 located on the front panel apron.

11. GRID-CURRENT METER M1

a. The grid current meter M1, indicates the relative grid current of the oscillator tube in either position of S3. In the DIODE position of S4, the meter indicates diode current.

12. PHONES

a. The PHONES jack J2 is located on the front panel apron to the left of the MOD jack J1. Headphones may be used in either position of S3 to obtain a beat between the oscillator of unknown frequency and a Model 159 Megacycle Meter oscillator. When headphones are used, the grid current meter M1, is disconnected by the jack J2.

13. FUSE

a. The Model 159 Power Supply is protected by a 1/2 amp MDL type cartridge fuse located on the floor of the chassis to the rear of the transformer.

b. To replace the fuse, remove the four feet from the base of the Model 159 Power Supply and slide the chassis forward out of the case.

14. PILOT LIGHT

a. The pilot light and its socket are located on a bracket attached to the rear of the front panel.

b. To replace the pilot light, slide the chassis out of the case as outlined in Paragraph 13b. Remove one screw holding the pilot light socket. Replace pilot light and re-fasten its socket.

OPERATION

CHAPTER 3

OPERATION

15. INSTALLATION

The Model 159 Power Supply requires no permanent installation.

16. PRELIMINARY OPERATIONAL CHECKS

a. Connect the selected Megacycle Meter to the Power Supply and the Power Supply to the source of line voltage.

b. Place the DIODE - OSC switch in the OSC position and the C.W. - MOD switch in the C.W. position.

c. Apply power by rotating the Sensitivity Control clockwise. The lighted meter face will indicate that power has been applied to the complete unit.

d. Adjust the SENSITIVITY Control for a meter reading about mid-scale. The grid current should stay on the scale as the tuning control located on the Megacycle Meter is varied over the band. The unit is now ready for use as a grid-dip meter.

e. Place the C.W. - MOD switch in the MOD position and the INT - EXT switch in the INT position, and adjust the SENSITIVITY Control for an on-scale meter reading. The grid-current will vary over wider limits on the MOD position than in the C.W. position. For grid-dip application the unit should be used in the C.W. position. The MOD position, however, provides a convenient means for identifying the oscillator when it is used as a signal generator.

f. With the INT - EXT switch in the INT position the oscillator is modulated by 120 cycles from the Power Supply. In the EXT position the oscillator may be modulated by an external source plugged into the MOD jack.

g. Place the DIODE - OSC switch in the DIODE position and adjust the Sensitivity Control for maximum meter reading. The Megacycle Meter may now be coupled into an active circuit and tuned for maximum meter response. Under these conditions the unit operates as an absorption wavemeter.

17. OPERATION AS A GRID-DIP OSCILLATOR

Adjust controls as indicated in Paragraph 16b. Couple into the passive circuit whose resonant frequency is to be determined. Tune over the frequency band until a dip occurs in the grid current indicating an absorption of oscillator energy. Back off on the coupling until a very small dip is obtained by tuning over the same general frequency range. Greater accuracy may be obtained by the use of loose coupling once the approximate frequency of the resonance has been established.

MAINTENANCE

18. OPERATION AS A VARIABLE FREQUENCY OSCILLATOR

Adjust controls as indicated in Paragraph 16b. Set to desired frequency by means of the tuning knob. Couple circuit under test either inductively or capacitively.

19. OPERATION WITH PHONES

a. Phones can be plugged into the PHONE jack for indication of a dip. A sharp click accompanies the dip in grid current for conventional application.

b. If indication of frequency of an oscillator is required, the phones will permit use as an oscillating detector with its resultant zero beat method of accurate frequency determination.

c. As a non-oscillating diode detector (switch S4 on DIODE) for the identification of modulated signals, oscillator harmonics, sound of parasitics of blocking character, etc., the Model 159 Megacycle Meter will be found very useful.

CHAPTER 4

MAINTENANCE INSTRUCTIONS

20. GENERAL

Preventive maintenance procedure is not recommended for the Model 159 Power Supply. Preventive maintenance is a series of operations including inspection, adjustment, lubrication, etc., recommended periodically for certain types of equipment to eliminate the possibility of unexpected interruptions in service. Critical adjustments may be disturbed by too-frequent inspection by personnel unfamiliar with the design of the Model 159 Power Supply. This may result in maladjustments causing errors in data that would be much more serious than an occasional operational failure.

21. CIRCUIT FAILURE

a. Most circuit failures will be evident from indications of the grid current meter M1, and reference to the schematic diagram.

b. If failure occurs, the instrument should be checked by the procedure outlined in Paragraph 16 and if trouble other than a defective tube is indicated, the instrument should be returned to Measurements.

22. TUBE REPLACEMENT

To replace the OA2 regulator tube, slide the chassis out of the case as outlined in Paragraph 13b, thereby exposing the tube underneath the chassis.

APPENDIX I

1. STORAGE

a. Remove dust from controls and outer surface of instrument with a clean rag.

b. Wrap instrument in heavy wrapping paper and seal seams with gummed tape or similar adhesive.

c. Store in a dry place. If excessive humidity is unavoidable, the wrapped instrument should be placed in a moisture-proof bag with a sufficient quantity of drying agent, such as silica gel, to insure a dry atmosphere.

(1) When the use of bag and desiccant is necessary, the instrument should be checked at 6-month intervals to determine the effectiveness of the seal.

2. SHIPMENT

a. Wrap the instrument with heavy wrapping paper and seal seams with gummed tape or similar adhesive.

b. Place in fibre-board carton or wooden box large enough to permit at least 3 inches of excelsior or similar packing material between the instrument and sides of the box.

(1) For export packing, the instrument must be wrapped in waterproof paper and the seams sealed with glue or similar sealing compound before being placed in a wooden box.

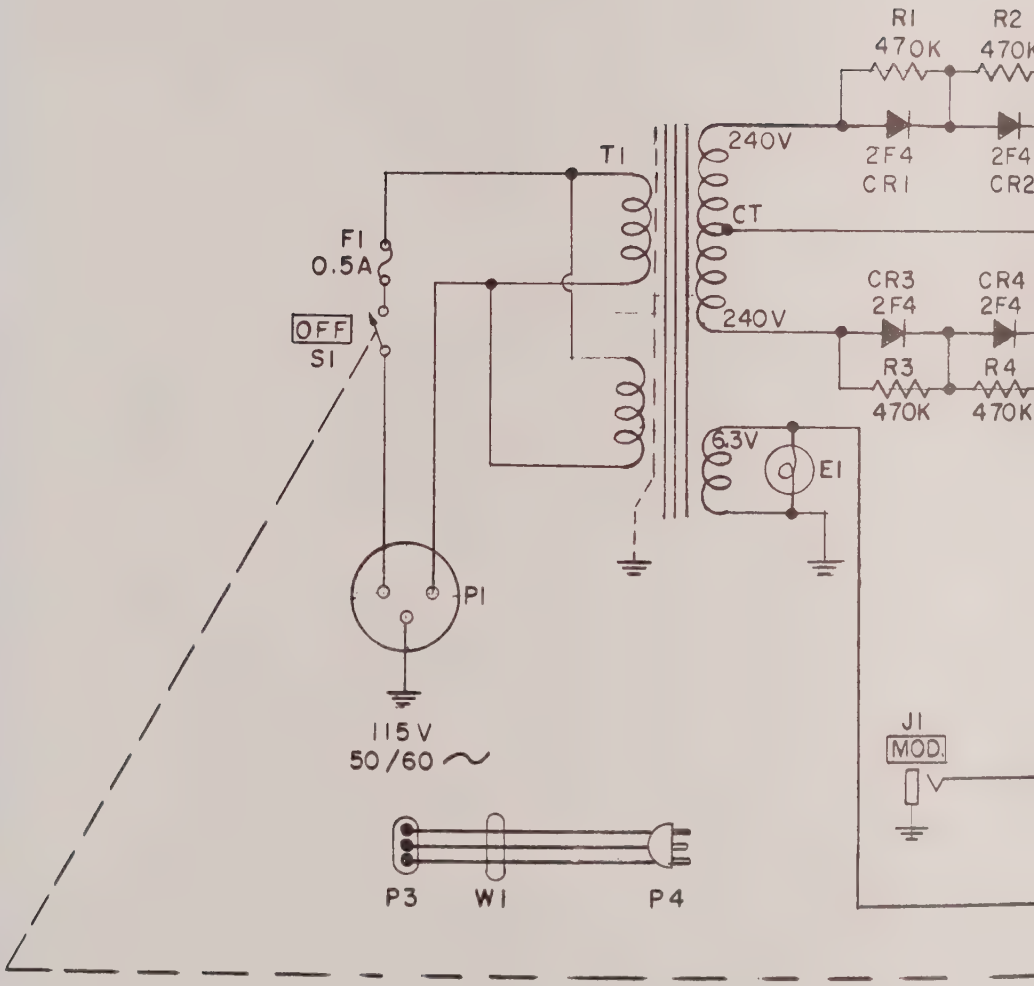
PARTS LIST

APPENDIX II
TABLE OF PARTS
MODEL 159 PS

Symbol	Measurements Part Number	Description
Capacitors		
C1	H-5310	Fixed; electrolytic; 2 section: 10-10 mf 450 VDC.
C2		
C3	H-5180	Fixed; paper dielectric; 0.5 mf 20%, 600 VDC.
Rectifiers		
CR1		Type 2F4.
CR2		Type 2F4.
CR3		Type 2F4.
CR4		Type 2F4.
CR5		Type 2F4.
Lamp		
E1	H-5582	Incandescent; 6 - 8 V GE #51.
Knob		
E2	H-7740-7	Round.
Fuse		
F1	H-5190-4	1/2 amp. Type AGC.
Misc.		
H1	H-2024	Handle; carrying.
H2	H-5507	Foot; rubber.
H3	H-7764	Strip; rubber trim. Front
H4	H-7765	Strip; rubber trim. Top.
Jack		
J1	H-7761	Phone, plain.
J2	H-7762	Phone, switched.
Meter		
M1	H-7679	Grid current; 50 ua movement.
Transistor		
Q1		Type 2N4240.

APPENDIX II
TABLE OF PARTS
MODEL 159 PS

Symbol	Measurements Part Number	Description
Connectors		
P1	H-7741	Male; recessed: 3 prong; power.
P2	H-7742	Female; 6 contact.
P3		Part of W1.
P4		Part of W1.
Resistors		
R1	H-3728-474	Fixed; composition; 470 K ohms 10%, 1/2 W.
R2	H-3728-474	" " 470 K ohms 10%, 1/2 W.
R3	H-3728-474	" " 470 K ohms 10%, 1/2 W.
R4	H-3728-474	" " 470 K ohms 10%, 1/2 W.
R5	H-5118	Wirewound; 1 K ohms 10 W.
R6	H-3728-101	Fixed; composition 100 ohms 10%, 1/2 W.
R7	H-3734-332	" " 3.3 K ohms 10%, 2 W.
R8	H-3734-332	" " 3.3 K ohms 10%, 2 W.
R9	H-3728-103	" " 10 K ohms 10%, 1/2 W.
R10	H-3728-274	" " 270 K ohms 10%, 1/2 W.
R11	H-3728-333	" " 33 K ohms 10%, 1/2 W.
R12	H-7763	Variable; 10 K ohms with switch
R13	H-3728-102	Fixed; composition; 1 K ohms 10%, 1/2 W.
Switches		
S1		Part of R12.
S2	H-7749	Rocker.
S3	H-7749	Rocker.
S4	H-7749	Rocker.
Transformer		
T1	H-7689	Power.
Tube		
V1		Regulator; OA2.
Cable		
W1	H-7746	Power; includes P3 & P4.



SCHEMATIC DIAGRAM
MODEL 159
POWER SUPPLY

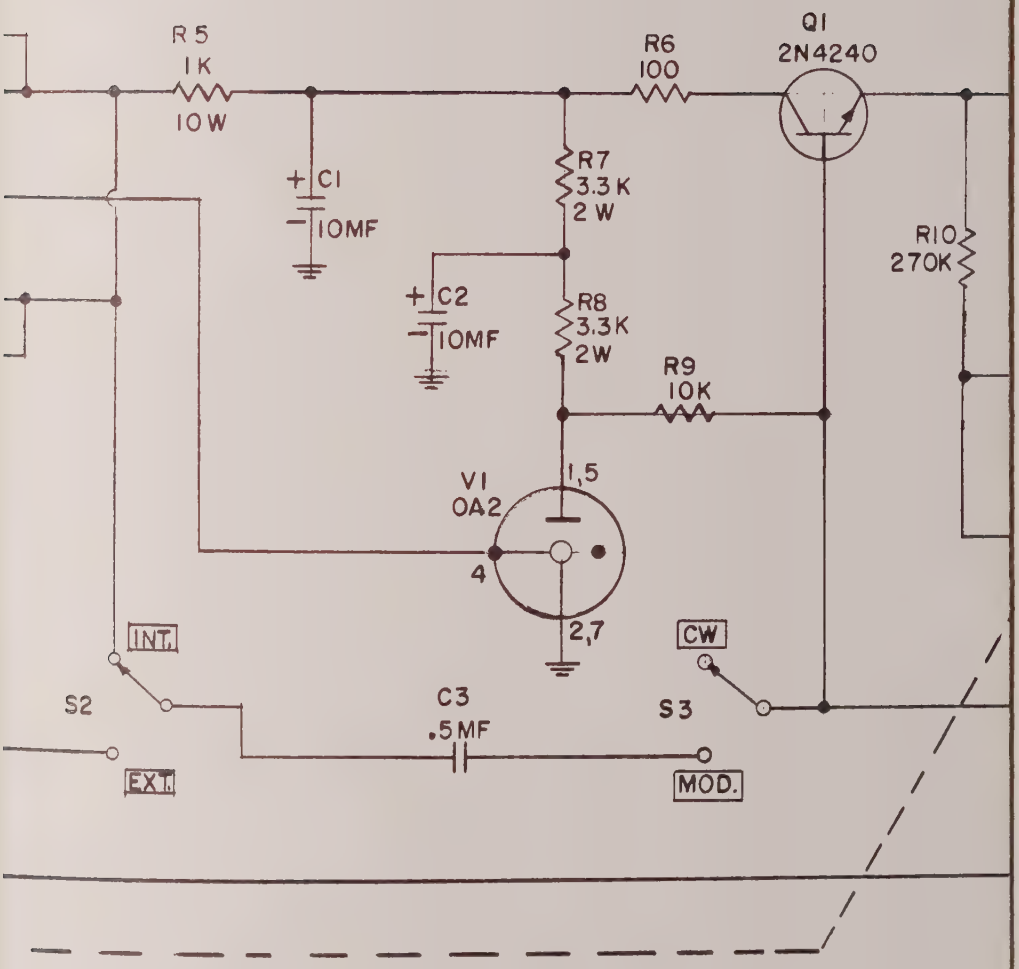
UNLESS OTHERWISE SPECIFIED

RESISTORS VALUES ARE IN OHMS, 0.5 W, 10 %

○ = FRONT PANEL CONTROL.

▭ = INDICATES PANEL MARKING.

C- 7755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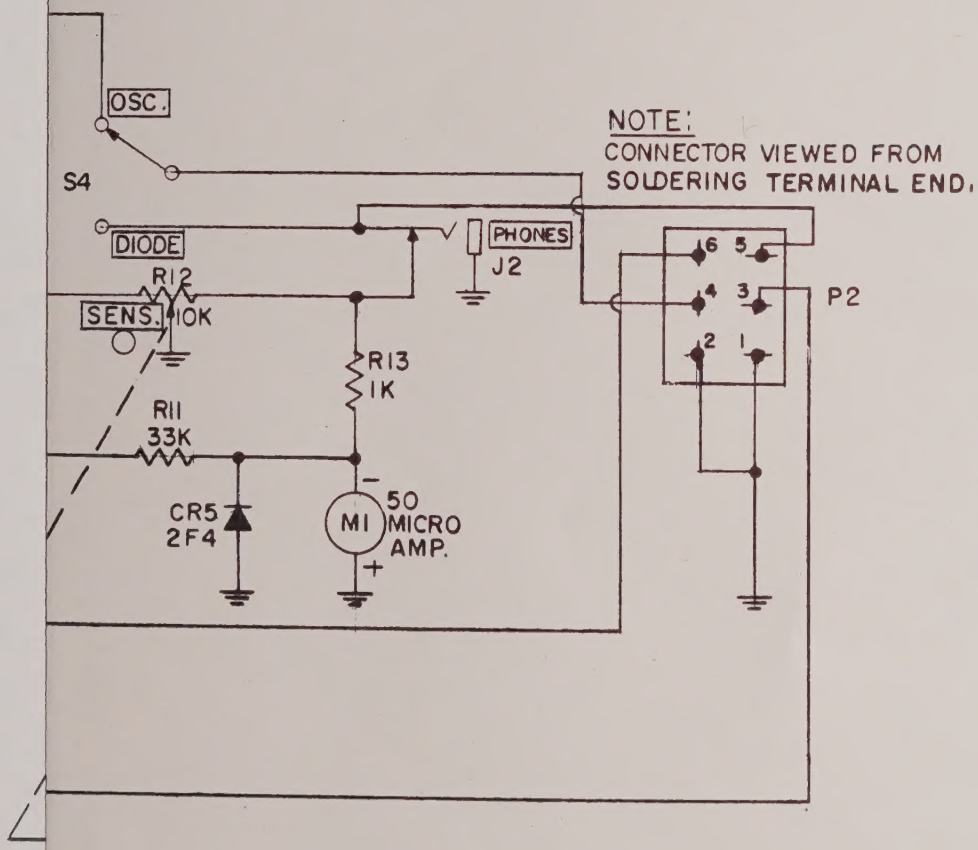
1K
10W
C1
10MF
R6
100
Q1
2N4240
R7
3.3K
2W
R10
270K
C2
10MF
R8
3.3K
2W
R9
10K
V1
0A2
1,5
4
2,7
INT.
CW
S2
S3
C3
.5MF
EXT.
MOD.


OSC.
S4
DIODE
R12
SENS. 10K
R11
33K
R13
1K
CR5
2F4
M1
50
MICRO
AMP.
PHONES
J2
NOTE:
CONNECTOR VIEWED FROM
SOLDERING TERMINAL END.
6
5
4
3
2
1
P2

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